

# ENTOMOLOGICAL NEWS

AND

## PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XX.

JANUARY, 1909.

No. 1.

### CONTENTS:

Williams—The Monterey Pine Resin Midge— <i>Cecidomyia resinicoloides</i> 1	Wellman—A Revision of the genus <i>Calospasta</i> Lec. .... 19
Cockerell—Some new bees of the genus <i>Coelioxys</i> . . . . . 8	Jensen—Observations on the Oviposition of <i>Oecanthus quadripunctatus</i> Beutenmuller . . . . . 25
Fox—A report on the species of the Siphonaptera found within the boundaries of the City and County of San Francisco, Cal. . . . . 10	Hood—Two new No. American Phlebotripidae . . . . . 28
Rowley—Notes on the study of some Catocalae. . . . . 12	Brimley—List of Moths observed at Raleigh, N. Carolina . . . . . 33
Banks—A new species of <i>Systropus</i> (Bombyliidae) . . . . . 18	Fditorial . . . . . 42
	Doings of Societies . . . . . 43
	Obituary—Alexander Craw . . . . . 48

## The Monterey Pine Resin Midge—*Cecidomyia resinicoloides* n. sp.

By FRANCIS X. WILLIAMS.

(Plate I)

This paper was written in the Entomological laboratory of Stanford University, and represents the biological\* results of nearly a year's study of a new species of *Cecidomyia*, whose larva inhabits the resinous exudations of the Monterey pine (*P. radiata*) growing about the University.†

As little study has been made of pitch-inhabiting midges, living as they do under such peculiar conditions, the writer has endeavored to clear up as far as possible some of those points in the life-history of this insect, which in other species were doubtful or not fully brought out.

Our only described species of *Cecidomyia* comparable to the Monterey pine resin midge in general habits is *C. (Diplosis) resinicola* O. S. (9). Brief notes are given on the habits of the same. Comstock in his report for 1879 (2) gives a some-

\* The anatomy which has been worked out by me is reserved for another paper.

† Later (June, 1908) I observed this insect in small numbers in the Monterey pine forests at Carmel, Monterey Co., Cal.

what longer account of its life-history, and Eckel (3) gives it still more in detail.

Felt (5) in an article on this species compiles largely from the last writer. Aside from a few notes by other writers, this is the extent of the literature relating to his eastern midge.

The Californian species recently found inhabiting the resinous exudations of the Monterey pine is somewhat larger than its eastern congener, and differs from it in other respects, both in the larval and imaginal stage. I place this new species in the genus *Cecidomyia*, adopting the generic distribution of Kertész, which Aldrich uses in his "Catalogue of North American Diptera" (1905).

***Cecidomyia resinicoloides* n. sp.**

Male. Length of body 4 mm., alar expanse 9-10 mm. Antennæ 2 plus 24 jointed, not much shorter than body, of dark color except scapus, which has grayish-red tinge; flagellum with small subglobular joints alternating with double subcylindrical ones; pedicels between the joints about equal to the diameter of the shorter joints, somewhat longer towards the end of the antennæ; joints verticillate, the length of the hairs of the verticils much longer than the shorter joints, and the longer ones slightly longer than the double joints; end of flagellum recurved dorsally almost into a circle.

Female. Length of body 5.5 mm., alar expanse 11 mm. Antennæ 2 plus 12 jointed, less than half as long as body, joints of flagellum subcylindrical, more than twice as long as broad, the basal ones longest; pedicels short, the hairs clothing the antennæ are slightly shorter than each single joint, with here and there one fully as long. Antennæ slightly upcurved. The black eyes in both sexes confluent above, occupying the whole surface of the head except a space around and below the antennæ and a portion of the occiput, which parts are brownish red. Some recurved blackish hairs arising from occiput, also a small bunch on frons below antennæ. Ground color of thorax grayish with slight brown or reddish-brown tinge (varying in intensity according to age) with the base of the wings and the sutures reddish, which color predominates generally in freshly emerged specimens, darkest on the dorsum with sparse bristly black hair, a row of which runs along a blackish stripe on each side of the median line of the scutellum, converging slightly posteriorly and then diverging and becoming more obscure. Viewed in another light this line is broken into an anterior and a posterior stripe and a short posterior median band. The light contrasting ground color brings out an apparent yellowish-gray stripe on

either side of the black dash, especially prominent outwardly. The pale hairs viewed against the body appear blackish. Abdomen reddish, somewhat darker on dorsum, in the female covered with coarse grayish or darker hairs with a few longer dorsal and ventral ones on the posterior part of each segment. Hairs proportionally longer and pale in the male, with a few longer dark ones on dorsum and venter as in female. Genitals pale; feet pale brownish, gray at base becoming blackish distally, with pale gray appressed pubescence; some longer and darker hairs on underside of femora. Halteres pale yellowish brown at base, darker reddish brown distally. Wings appearing smoky black owing to the numerous dark hairs covering them, fringes long and grayish; second longitudinal vein arcuate in its latter portion and ending immediately beyond apex. Described from several fresh males and females taken in the Stanford Arboretum, and now in the Stanford University Entomological collection.

Egg—.60 mm. long, elongate rounded at both ends, about three and one half times as long as wide, bright orange.

Mature larva—About 10 mm. long (but capable of much greater extension and contraction), width 2 mm.; fusiform, tapering more gradually caudad, somewhat wider than deep. Color bright orange, the stomach showing as dark brown and the Malpighian tubules as deep orange. 14 segments including the head which is very small, and which together with the supernumerary segment is often partially withdrawn into the following segment; segments 6 and 7 widest, 11 quite slender and appearing compound, 12 small, below 11 and deeply cleft. Breastbone elongate and varying considerably in form, somewhat incised anteriorly. Two large anal spiracles, and lateral ones on segments 1 and 4—10. Long transverse dorsal and ventral patches of short bristles, best developed anteriorly where they point caudad, posterior spines point cephalad. These bristles are no doubt used to assist in locomotion.

Pupa—Length 5 mm.; stout, orange red; thorax and appendages (with the exception of their free ends which are pale translucent with an orange tinge) darker; legs reaching nearly to end of 6th abdominal segment and free beyond the 2nd. A slender, curved yellowish-brown breathing tube behind each eye, with a rough, dusky, pointed cocoon-breaker at the base of each antenna at the angle formed by the vertex and frons. Thorax smooth and shining; abdomen duller and rougher; spiracles reduced.

#### LIFE HISTORY.

Owing to the unusually mild spring weather of 1908, *Cecidomyia rcsinicoloides* was probably on the wing somewhat earlier than usual. The first adult observed was on March

16th, which specimen, however, was bred in the warm laboratory. March 19th a specimen was taken resting on the trunk of a Monterey pine growing in the Stanford Arboretum, and a day later several of the midges emerged indoors. Early in April adults were plentiful, and one female was observed probing about rapidly with her long, slender ovipositor on a hard, dry resin nodule. No eggs were found here, however, but on the same day a few soft, oblong, orange-colored eggs were discovered in a fissure at the base of a rather soft, whitish lump of resin, which harbored a colony of *resinicoloides* pupae. Late in May a short search revealed numerous extruded pupal shells, no adults and but few eggs. No search was made for larvae in summer, but in September, 1907, many well-grown ones, scarcely smaller than mature larvae of spring, were found. It is quite likely that the insect is single-brooded, spending the greater portion of its life in the larval state. As with *C. resinicola* of the Eastern United States, our western resin midge has gregarious habits, the larvae numbering from a very few to more than fifty in the same nodule, which is always soft so long as the insects are feeding. Colonies of *resinicoloides* larvae were most commonly found in masses of pitch which exuded from places where limbs had been sawed off at the trunk, the bark closing around such wounds, frequently forming hollows where much resin accumulated, and thus furnished an ideal place for a colony of these insects. Smaller colonies were found in cracks in the branches filled with resin, and in small resinous globules on twigs. In no case did it seem probable that the larvae were the primary cause of the resinous exudation. Besides occurring on Monterey pine, a small colony of these larvae were discovered in a lump of resin on a *Pinus muricata* (?) growing in the Stanford Arboretum.

Several experiments were made with *resinicoloides* larvae to ascertain if possible whether they could make a prolonged stay completely buried in the resinous mass. Whenever larvae were covered with semi-liquid resin they worked their way to the surface if the resin had not become too hard, and brought

their anal spiracles to the surface of the mass. This was usually done within twenty-four hours, and those larvae, unable to work their way to the surface, eventually perished. Several mounted in Canada balsam lived in that medium for over a week, but their anal spiracles were exposed at the edge of the coverglass. It is evident that the larva must come to the surface for air, though this may be only at long intervals. It was difficult to observe the way in which the larva gets its air supply under natural conditions, owing to the opaqueness of the resin, but investigation showed that the insect always had its anal spiracles towards the surface of the nodule, at times in a hollow in the pitchy mass, and in other cases so deeply submerged in the medium that it seemed doubtful if the insect could extrude its terminal spiracles. A rule apparently quite constant was that soft resin harbored large larvae, while in the harder, often discolored medium these insects were shortened and of a reddish color, as if preparing for pupation. A lump of soft resin if hardened would always stunt the larvae within. These would often pupate, but without forming a cocoon.

Pupation does not occur until spring, and is probably dependent upon temperature. During winter many larvae formed pupal chambers and lay therein as abbreviated reddish prepupae. A note dated January 18th, 1908, states that fresh, soft resin harbored feeding larvae, while hard, crusted resin contained larvae in their pupal chambers, the latter being the more numerous. Another note of January 17th states that many larvae were observed still feeding, and that the shortened ones are to be found in the harder gum, reddened perhaps by excrement.

Before transforming the larva makes a cocoon of thin papery consistency, a good deal longer than the prospective pupa and with one end bulging from the resinous mass as a cap. A number of cocoons may be found in close proximity, so that their walls touch. In such cases they resemble somewhat the miniature comb of a social wasp. Whether the cocoon is spun by the larva was not determined; I am inclined

to believe that it is, since the cocoon is not of the same consistency as the surrounding medium, having a more papery texture. A few strands of silk-like structure are sometimes found about the pupal chambers. It is evident that the resinous cap is formed by the larva pressing the resin outwardly with its anterior part, possibly using the "sternal spatula" for the purpose.

On March 11th the first pupae were found, but there were still a few feeding larvae, the great majority, however, being in pupal chambers. These latter do not pupate immediately (except perhaps the late-maturing ones), but hibernate for some time before transforming. When the insect is near pupation the thoracic segments become differentiated from the following segments by contracting into a smooth cone, the inter-segmental grooves disappearing and the appendages becoming visible under the skin as alternate darker and paler portions, and the two extremities of the forming pupa separate from the enveloping exuvium. The process of shedding this exuvium was not observed; several pupae, however, were examined as they lay in their cells, and the larval skin was found clinging to the last two or three segments; other pupae were found to have the larval skin wholly removed, the spatula and head skeleton remaining with the cast exuvium.

The pupa is quite active, reminding one somewhat of that of a lepidopterous insect. As the midge develops the anterior portion of the pupa darkens, especially about the head, and at the proper time (two or three weeks) is extruded through the cocoon cap and the fly issues from its shell. The adults emerged mostly in April and early May, and were found to be more sluggish than *Cecidomyia* (*D.*) *pini-radiatae*.

A great diversity of habits exists among the various pine midges, and the making synonymous of forms of widely different habits seems to me open to question. *C. resinicola* as we have seen has habits quite similar to *C. resinicoloides*, its western representative, but *C. pini-inopis*, considered synonymous with *resinicola*, attacks the needles of *P. inopis* and pupates in a resinous cocoon on a needle.

*C. pini-radiatae* lives at the base of the needles of Monterey pine, which become stunted and swollen as a result of its attacks, and pupates within the fascicle. This refers to *C. pini-radiatae* about Stanford University, for in Golden Gate Park, in San Francisco, apparently the same species produces no swelling of the pine needles (which, however, turn yellow), while the pupa of the latter is enclosed in a resinous cocoon which is often fastened externally to the scales at the base of the needles. The fact that the Golden Gate Park *C. pini-radiatae* neither stunt nor swell the needles was discovered by SNOW (11). On the European pines are found several species of midges with habits corresponding to those of our North American *Cecidomyidae*. Much interesting work remains to be done with these insects.

*C. resinicoloides* was found to be singularly free from parasites, as but two examples of a chalcid fly (which is evidently the *Syntaxis diplosidis* that preys upon *C. resinicola*) were obtained from the many larvae and pupae reared to maturity.

---

#### BIBLIOGRAPHY.

- 1.—ALDRICH, J. M. (1905).—Catalogue of N. A. Diptera, pp. 151-152, 160.
- 2.—COMSTOCK, J. H. (1879).—*Diplosis resinicola*, (Rep. Dept. Agric., 1879, p. 256).
- 3.—ECKEL, L. S. (1903).—The Resin-Gnat *Diplosis* and Three of its Parasites (Ent. News, XVI, pp. 279-284).
- 4.—FELT, E. P. (1903).—*C. pini-rigidæ*, (N. Y. State Mus., Memoir 8, II, pp. 423-425).
- 5.—FELT, E. P. (1903).—*C. resinicola*, (N. Y. State Mus., Memoir 8, II, 410-413).
- 6.—KERTESZ, C. (1902).—*Catalogus Diptorum*, II, pp. 116-117.
- 7.—MIK, Jos. (1897).—Einiges über Gallmücken, (Wein. Ent. Zeit. XVI, pp. 290-292).
- 8.—OSTEN SACKEN (1862).—On the Habits of the *Cecidomyidae* (Mon. Dip. N. A., Pt. I, pp. 179-198).

- 9.—OSTEN SACKEN (1871).—Biological Notes on Diptera (*D. resinicola*, etc.), (Trans. Am. Ent. Soc., III, pp. 345-346).
- 10.—PACKARD, A. S.—*Diplosis resinicola* and *Pini rigidæ*, (5th Rep. U. S. Ent. Com., p. 797 *et seq.*, 1886-1890).
- 11.—SNOW, W. A. (1900).—The Destructive *Diplosis* of the Monterey Pine, Ent. News, XI, (389-494).
- 12.—TOWNSEND, C. H. (1893).—Notes on some Cecidomyiidae of the Vicinity of Wash., D. C., (*D. resinicola*, etc.), (Proc. Ent. Soc., Wash., II, pp. 389-390).

## EXPLANATION OF PLATE I.

Fig. 1.—Adult, ♀.	} all greatly enlarged.
Fig. 2.—Pupa.	
Fig. 3.—Larva	

Some new Bees of the genus *Coelioxys*.

By T. D. A. COCKERELL.

***Coelioxys deani* n. sp.**

♂.—Length about 7 mm.; black, with the tegulae dark brown, and the tarsi obscurely more or less brownish; wings with the apical margin broadly dusky; nervures piceous, stigma dull reddish. Vertex dullish, with large irregularly-placed punctures; cheeks with much white hair, and below with a broad shining beveled space; eyes black, their pubescence only moderately long; face covered with white hair; antennæ entirely black; mandibles black; tongue and labial palpi bright ferruginous; mesothorax and scutellum shining, with large close punctures; scutellum with no median projection, its lateral teeth small and curved; anterior border of mesothorax with a practically continuous band of creamy-white scale-like hairs; posterior lateral corner of mesothorax with patches of white hair, and some in scutello-mesothoracic suture; spurs ferruginous; abdomen shining, with strong but well-separated punctures; hind margins of segments 1 to 5 with conspicuous narrow white hair bands; first segment with a weaker band round the edge of the basin; no other bands, but third and fourth segments with a little hair in the transverse depressions; fifth segment strongly toothed at sides sixth produced, and with a deep broad groove above, its teeth number six as usual but the upper apical ones are rudimentary. Among American species readily distinguished by its very small size, and the produced apical segment, which is longer than broad, if the breadth be counted from the *inner* bases of the lateral teeth. The apex of the